

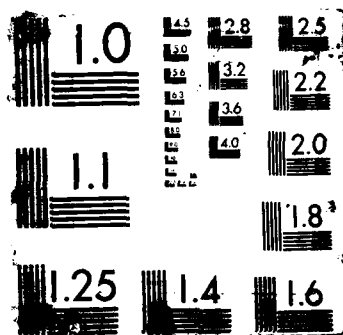
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2 IMPLEMENTATION GUIDANCE(U) PLANNING RESEARCH CORP  
SIERRA VISTA AZ 06 MAY 88 DAEA18-84-D-0058

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**ARMY IMPLEMENTATION  
of  
DOD & FEDERAL STANDARDS**

**VOLUME 2**

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**IMPLEMENTATION GUIDANCE**

PREPARED UNDER CONTRACT DAEA18-84-D-0058  
DELIVERY ORDER 0088

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FOR

U.S. ARMY INFORMATION SYSTEMS ENGINEERING COMMAND  
FORT HUACHUCA, ARIZONA 85613-5300

PREPARED BY

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DOD & FEDERAL STANDARDS**

**VOLUME 2**

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## ABSTRACT

This report is the second of a set that provides recommendations for adoption of standards and guidance for use of standards to support improved effectiveness of Army information systems. Recommendations for adoption of standards are contained in Volume 1. Guidance for implementation of standards in Army procurements is contained in this volume. The general framework for implementation is contained in the body of this report. Specific guidance for the individual information mission areas is contained in annexes keyed to the specific mission areas.



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## IMPLEMENTATION GUIDANCE - GENERAL

1. Introduction. The Department of the Army (DA) has recognized that many of the existing information systems are independent and do not share data. These systems include products from a multitude of vendors, often resulting in a high degree of incompatibility and noninteroperability of hardware, software, data, and communications. This situation results in inefficiency, poor performance, and high expense. This situation can be reduced or relieved by the introduction of standardization at specified interface points.

1.1 Basis for Standards. Standard interfaces which will enable multivendor equipment and software to interoperate are needed to make the Army information systems more productive and more cost effective. These standards will provide a basis for interoperability of equipment and systems which can:

- a. Share information and processing power.
- b. Avoid duplication of data and data processing systems.
- c. Develop standard solutions for common needs.
- d. Avoid limited use designs without regard to future broader use.
- e. Reduce software maintenance costs by limiting the variety and redundancy of supported software.



f. Enable source data collection for use by a broader range of users.

g. Diminish labor-intensive functions by avoiding voluminous data transfers and rude dependency on printed output.

1.2 Standards Environment. Product integration strategy is not uncommon and supports the goal of full and open competition within the vendor community. However, when their strategy is applied to the Army Information Architecture (AIA), problems are encountered. AIA includes three board tiers of information systems support with availability to all users. In trying to integrate within and across these tiers, the effort has become extremely complex with no available open protocols and a lack of industry-wide standards. Committing the Army to existing standards required for system integration narrows the competitive field and range of options with published open standards.

2. Scope. This document describes the Information Mission Area (IMA) standards, when and how they will be employed for system application, and/or system development. It is organized with information applicable to all approved standards in the basic document followed by annexes which provide the details of the standards.

2.1 Purpose. The purpose of this document is to provide acquisition offices, contracting officer's representatives, contractors, vendors, and all other representatives engaged in and responsible for acquiring or delivering products to the Government, specific implementation guidance for IMA standards. This document is supplemented by Annex A, Technical Report, Telecommunications. That document provides background and rationale for the implementation

guidance contained here. Annexes of this document identify the minimum standards and specify how and when they will be applied. This document applies to existing systems, and to new acquisitions in the IMA.

2.2 Applicability. These standards and associated implementation guidelines are applicable to information systems in one or more of the three tiers of the AIA. These standards and associated guidance should not be construed as constituting the total Army standards in use or permitted for information system acquisitions. These particular standards focus on the IMA interoperability task. Other standards such as those for quality, procedures, environment, mechanical and other such related conditions exist and must be addressed in each acquisition as appropriate. These standards are for application to all new hardware and software acquisitions and to upgrades to existing systems. Note that the existence of these standards will not be used as the sole justification for initiating upgrades to existing systems, but will be included in all other functional upgrades. The important consideration in upgrading existing systems is to do it logically and when the opportunity presents itself. Systems that are in the definition phase of their life cycle should be designed to avoid fielding delays, unless changes occur which provide the opportunity to incorporate these new standards.

3. Verification of Deliverables. Verification of deliverables will be accomplished through requirements stated in specifications or the performance work statement for a specific acquisition. Compliance with the specified requirement shall be governed by the needs of each individual acquisition. Contractors may be required to perform operational tests, provide certification from an authoritative source, or perform other tests to demonstrate full, functional compliance with the specified requirement. Where applicable, authoritative sources should be spelled out in the

specifications or performance work statement as illustrated in the annexes. The contractor may typically be required to provide a plan for operational demonstration with his proposal. This plan shall delineate the methods and procedures by which the contractor intends to demonstrate to the Government how the proposed product satisfies the requirements of the standard. The government will review this plan to ensure all requirements are tested and met.

4. Waivers. Potentially, there are some unique systems and upgrades that logically should not be governed by these standards. Migration of existing systems to the objective architecture should be evaluated on a case-by-case basis and implemented only as systems upgrades occur. However, during systems upgrades, consideration of such factors as return on investment, interfaces with other systems, system life expectancy, connectivity and interfaces with the Army Corporate Data Base (ACDB) should be used as the basis of good, sound, business decisions. From this evaluation, determinations will be made whether or not to continue to operate a given system as it is until it is replaced, to upgrade the system to these standards, or possibly to provide gateways from the system to other networks. When this evaluation justifies noncompliance to these standards, an exception to the standards or a waiver should be requested.

4.1. Waiver Procedures. Request for exceptions or waivers to IMA standards will be submitted through command channels to HQDA (DISC-4). Requests will contain complete justification as to why the exception is necessary. After initial review at this HQ, requests concerning tactical/theater systems acquisitions will be forwarded to HQ, USAMC, for comment. Requests for strategic and sustaining base systems acquisitions will be forwarded to HQ, USAISC, for comment. Waiver of the

mandatory application of these standards to future systems may be appropriate when justified by economics or interoperability considerations.

4.2 Lifetime of Waivers. All approved waivers should be considered interim measures and assigned an expiration date. Ultimately, waived systems should be brought into compliance with the standards set forth herein or as later amended. All waiver requests should include information depicting when and how the subject system will migrate to the IMA standards.

5. Description of the Three Tiers. The official description of the three tiers is provided in Department of the Army Pamphlet 25-1.

## APPENDIX A

### IMPLEMENTATION GUIDANCE FOR TELECOMMUNICATIONS

A1. Communications. Three Tier configuration requires an underlaying communications network that supports the transmission of data horizontally and vertically. The communications network must be rapid, reliable, robust, and responsive to support Army organizations regardless of location or environment. Additionally, the successful networking of the heterogeneous population of Army information systems requires the establishment of standards for interoperability and the control of systems configurations and operating procedures. To those ends, the telecommunications strategy is focused on the use of common-user communications means and open system protocol standards.

A2 Common-User Communications Concept. Common-user communications are essential for controlling costs and for providing the necessary robustness and flexibility. Only when common-user communications means are operationally inadequate will use of other means be permitted.

A2.1 Strategic and Long Haul Communications. For strategic and long-haul requirements, common-user communications will be provided by the Defense Communications System (DCS). The DCS includes a mix of Government and commercial leased services to meet the worldwide communications needs of the DoD. The primary DCS service for data communications is a packet switching network called the Defense Data Network (DDN). All new systems acquisitions and major modifications to existing systems will be required to include the provision and use of DDN interfaces in their acquisition packages. The use of DDN does not necessarily require the use of the full suite of DoD protocols normally associated

with DDN. The use of the DDN X.25 basic interface allows the use of Systems Network Architecture (SNA) protocols or other non-standard protocols by allowing those protocol packets to be encapsulated as X.25 packets. This permits those packets to traverse the DDN transparently.

A2.2 Sustaining Base Communications. On installations, posts, camps, and stations, common-user communications will be provided by a base-wide communications network.

A2.3 Theater/Tactical Communications. In tactical and forward areas, common-user communications will be provided by the combat net radio, the Army Data Distribution System (ADDS), and the area communications system. These means, individually, or in aggregate, will not have the full capabilities of the strategic means, and the systems proponent must determine the extent of support they will receive before deciding to introduce an information system or requirement into tactical or forward areas.

A3 Computer Communications Architecture. A computer communications architecture is a set of structured protocols which implement the communications functions. The International Organization for Standardization (ISO) has developed a model of the functions that are required for communications between computers in a multivendor environment and is defining standard procedures and protocols to be followed in each of seven functional layers of that model. It is the Army objective to select these protocols at each layer and to adopt these standards when commercially available and proven.

**A4 Migration/transition.** An evolutionary process is required to move from present communications to the common-use environment of the objective configuration. This process must capitalize on existing investments, accommodate technological and availability limitations, and be affordable. Because a significant capital investment exists in vendor proprietary systems, the migration/transition must consider methods of implementing the objectives without scrapping the existing systems. Therefore, as an interim measure, implementation of the standards set forth may require the use of gateways to convert between the various vendor protocols and the common-user protocols. These gateways can be expected to be vendor offerings as OSI becomes a reality and not require Army-unique procurement actions.

**A4.1 Objective Communications.** The objective configuration for the installation is a fully integrated, multifunction, digital communications system which will be implemented when technologically feasible and when resources are made available. Near-term requirements may be satisfied by separate voice and data systems connected to the long-haul or local area networks.

**A4.2 Security.** Classified traffic will be protected by communications security (COMSEC) and/or physical isolation until multilevel security is feasible.

**A4.3 Interim Protocol Suite.** DoD protocols will be used as the interim protocol suite until an OSI products become universal offerings from industry.

**A4.4 Transition Example.** The Army Standard Information Management System is typical of the systems in use which will require a transition strategy to the open systems computer communications architecture. The present ASIMS network uses

dedicated lines and SNA protocols. From this foundation, an evolutionary process is planned. The transition from the use of dedicated lines and SNA protocols, as a first step, will move to the addition of hardware and software which will interface the Tier 1 and Tier 2 assets of ASIMS to DDN (X.25 basic interface). This will replace the use of dedicated lines with the common user DDN using SNA protocols. This phase will continue until the commercial OSI products are available and implemented. During this later phase of conversion, replacement systems and software must use OSI protocols, and older systems will phase-in as upgrades occur. In summary, a multiphased, gradual changeover is planned which involves changing from dedicated lines to DDN and, subsequently, to a complete OSI network.

A5 Standards. Standards for telecommunications are contained in Annexes A through D which follow. Each annex provides the framework and guidance for the application and use of the identified standards for each service for which the annex is prepared.



**ANNEX A  
GOVERNMENT OPEN SYSTEMS INTERCONNECTION PROFILE  
(GOSIP)**

1. Effective date. TBD

2. Applicable to.

- a. Tier(s) 1,2 and 3
- b. All new IMA system acquisitions.
- c. Existing IMA systems for upgrades.

3. Reference Documents.

3.1 Government Documents.

Government Open Systems Interconnection Profile (GOSIP) Draft version 1.0, 27 October 1987

3.2 NonGovernment Documents.

- a. IEEE 802.3E Physical Signaling, Medium Attachment and Baseband Medium Specification, Type 1Base5
- b. EIA TR 41-8 Premises Wiring

4. Discussion.

4.1 Purpose of standards. To obtain required interoperability and integration of IMA systems and components within and between the tiers of the Army Information Architecture as defined above in paragraph 2.

4.2 Background. The standards cited in the reference and the further profiling contained in this annex define the environment in which information systems may be interconnected and further provides a capability to permit interoperation. Note that the suite of standards specified does not insure interoperability. Further standardization efforts are required in other portions of the AIA that insure the particular operating system recognizes and supports the appropriate service access points and that data representation among systems contains some commonality of function and definition.

5. Text for Solicitation.

5.1 Specification.

5.1.1 Scope. This specification provides the definition of protocols to establish a commonality of communications functions for the interconnection of information systems between tier 3 elements, between tier 3 and 2 and to tier 1.

5.1.2 Requirements. The vendor shall provide an open system computer communications architecture function in accordance with the provisions outlined

for the Government Open System Interconnect Profile (Ref 3.1) with the following specific options/exceptions.

**5.1.2.1 End System Specification.**

**5.1.2.1.1 Physical Layer.** The vendor shall provide a physical layer in accordance with the IEEE Standard 802.3 Carrier Sense Media Access/Collision Detection (CSMA/CD) (para 4.2.1 ref 3.1) except that the physical medium shall be twisted pair unshielded wiring conforming to reference 3.2.b and attaching to the medium as per reference 3.2.a.

**5.1.2.1.2 Data Link Layer.** The vendor shall provide a data link layer which conforms to the Media Attachment Control of IEEE Standard 802.3 (para 4.2.1 ref 3.1) and the Logical Link Control of IEEE Standard 802.2 (para 4.2.2 ref 3.1).

**5.1.2.2 Intermediate Systems.**

**5.1.2.2.1 Physical Layer.** The vendor shall provide a physical layer interface with functional characteristics and interchange circuits as defined in EIA RS-232D and electrical characteristics in accordance with MIL-STD-188-114A.

**5.1.2.2.2 Data Link Layer.** The vendor shall provide a data link layer consisting of High Level Data link Control (HDLC) Link Access Procedure B (LAP B) with the 1984 version of CCITT X.25 (para 4.2.2 ref 3.1).

**5.1.2.2.3 Network Layer.** The vendor shall provide a network layer in conformance to the 1984 CCITT X.25 (para 4.2.3 ref 3.1).

**5.1.2.3 All Systems.**

**5.1.2.3.1 Applications Layer.** The vendor shall provide applications layer protocols to allow appropriate service access points from operating systems to File Transfer, Access, and Management, (FTAM) and Message Handling System (MHS) and other such protocols as may be included and profiled in reference 3.1.

**NOTE TO ACQUISITION AUTHORITIES.** The GOSIP is not at this time a complete document. It is intended to be modified and updated as new capabilities are standardized and agreed upon. Refer to the version in effect on date of solicitation for most current requirements.

**5.1.3 Definitions.**

**5.1.4 Integration.** (Describe principal interfaces within the IMA between this acquisition and other IMA system components).

**5.1.5 Interoperability.** (Describe functional compatibilities of languages, operating systems and the like).

**5.1.6. Characteristics.**

**5.1.7 Performance.** (Describe in terms of services to be provided and functions to be performed).

5.1.8 Security. (Describe security requirements in the interoperability environment, if required. (If none , so state).)

5.2. Quality Assurance.

5.2.1 The Government will explicitly determine compliance with IMA standards for this acquisition. Compliance evaluation may include, as appropriate, the following.

5.2.1.1 Independent use of certification procedures.

5.2.1.2 Independent operating tests in actual or simulated environments.

5.2.1.3 Observance of contractor test procedures or certification procedures during and/or following production.

5.2.1.4 Contractor certificates of compliance.

5.2.1.5 Et Seq.

5.3 Instructions for preparation of technical proposals. Offerers shall address, in a separate section of the technical proposal the IMA standards for the interoperability and integration. This section shall include, but is not limited to:

5.3.1 Detailed description of the characteristics of the products offered which fully comply with the IMA standards.

5.3.2 Test plans for demonstrating full compliance with the standards.

5.3.3 Identification of certification procedures to be used to demonstrate compliance with IMA standards. Quality assurance and product testing shall be in accordance with the procedures outlined in reference 3.1. The vendor shall give priority consideration to hardware and software which has been tested and certified by the National Bureau of Standards through the National Voluntary Laboratory Accreditation Program or has been tested, certified and qualifies for the mark of the Corporation of Open System or other nonprofit testing and certification organization as may be deemed satisfactory by the Government.

**ANNEX B  
INTEGRATED SERVICES DIGITAL NETWORK  
(ISDN)**

1. Effective date. TBD

2. Applicable to:

- a. Tier(s) 1, 2, and 3
- b. All new IMA system acquisitions.
- c. Existing IMA systems for upgrades.

3. Reference Documents.

3.1 Government Documents. None

3.2 Non-Government Documents.

International Telegraph and Telephone Consultative Committee, VIIIth Plenary Meeting, Malaga-Torremolinos, 9-18 October 1984, RED BOOK VOLUME III - FASCICLE III.5 Integrated Services Digital Network (ISDN) Recommendations of The Series I. Integrated Digital Services Network.

**NOTE**

In Table 3.1 are CCITT RED BOOK Recommendations for ISDN, carried to the depth necessary to distinguish between various classes of material. Recommendations with double asterisk (\*\*) should be cited in Army switch procurements as essential for compliance. Recommendations with a single asterisk (\*) should be cited as being important background. Recommendations with no asterisk provide general information that is not necessary for specification. It is particularly important that recommendations I.430, I.431, I.441, I.451, I.460, I.461, I.462, and I.463 be made mandatory parts of specifications because they provide the detailed interface specifications that allow devices from various vendors to interoperate.

TABLE 3.1 Outline of CCITT Recommendations for ISDN

<u>SERIES</u>	<u>TITLE</u>
I.100	Frame of I-Series Recommendations
I.110	General Structure of the I-series Recommendations
I.111	Relationship With Other Recommendations Relevant to ISDNs
I.112**	Vocabulary
I.120	Integrated Service Digital Networks (ISDNs)
I.130**	Attributes From The Characterization of Telecommunications Services Supported By An ISDN and Network Capabilities of An ISDN
I.200	Service Aspects of ISDNs
I.210	Principles of Telecommunications Services Supported By an ISDN. (* /3 Access Model)
I.211*	Bearer Services Supported By an ISDN. (** /2.1.1.3, /2.1.6-.7, /2.2.1-.2, /3.1.1-.3, /3.1.6-.7, 3.2.1-.2)
I.212	Teleservices Supported By an ISDN
I.300	Network Functional Principles
I.310	ISDN -- Network Functional Principles
I.320	ISDN Protocol Reference Model
I.330	ISDN Numbering and Addressing Principles
I.331	Numbering Plan For the ISDN Era
I.340	ISDN Connection Types
I.400	ISDN User-Network Interfaces
I.410*	General Aspects and Principles Relating to Recommendations on ISDN User-Network Interfaces
I.411*	ISDN User-Network Interfaces -- Reference Configurations
I.412*	ISDN user-network Interfaces -- Interface Structures and Access Configurations
I.420*	Basic User-Network Interface
I.421*	Primary Rate User-Network Interface
I.430**	Basic User-Network Interface -- Layer 1 Specification
I.431**	Primary Rate User-Network -- Layer 1 Specification
I.440(Q.920)*	ISDN User-Network Interface Data Link Layer--General Aspects
I.441(Q.921)**	ISDN User-Network Interface Data Link Layer Specification
I.450(Q.930)*	ISDN User-Network Interface Layer 3 - General Aspects
I.451(Q.931)**	ISDN User-Network Interface Layer 3 - Specification
I.461(X.30)**	Support of X.21 and X.21 bis Based Data Terminal Equipments (DTEs) By an Integrated Services Digital Network (ISDN)
I.462(X.31)**	Support of Packet Mode Terminal Equipment By an ISDN
I.463**	Support of Data Terminal Equipments (DTEs) With V-Series Type Interfaces By an Integrated Services Digital Network (ISDN)
I.464**	Multiplexing, Rate Adaptation and Support of Existing Interfaces For Restricted 64 kbit/s Transfer Capability
I.500	Internetwork Interfaces
I.600	Maintenance Principles

#### 4. Discussion.

4.1 Purpose of standards. To obtain required interoperability and integration of IMA systems and components (within) (between) the Tier(s) stated in 2 above.

4.2 Background. An ISDN is a network, in general evolving from a telephony IDN, that provides end-to-end digital connectivity to support a wide range of services, including voice and nonvoice services, to which users have access by a limited set of standard multipurpose user-network interfaces. Types of user information supported via ISDN include Speech, Sound, Text Facsimile, Video-tex, Video and others. This concept requires a family of CCITT Recommendations.

4.3 The I-Series Recommendations. The I-series covers:

- the ISDN concept and principles
- service capabilities
- overall network aspects and functions
- user-network interfaces
- internetwork interfaces

The I-Series Recommendations provide principles and guidelines on the ISDN concept as well as detailed specifications of the user-network and internetwork interfaces. They furthermore contain suitable references so that the detailed Recommendations on specific elements within the network can continue to be developed in the appropriate Recommendation series.

4.4 Army ISDN position. Since 1984, it has been Army policy that major installation-level communications upgrades use the ISDN architecture and standards. In 1984, such standards were just emerging from committee and had not been ratified or translated extensively into systems. That situation has changed. The basic standards have been refined extensively, ratified extensively, and have had a profound impact on systems emerging into the market. It is now possible to identify the appropriate standards to call out in a specification and to anticipate that an acceptable bid base will respond to them.

#### 5. Text for Solicitation.

##### 5.1 Specification.

5.1.1 Scope. This specification establishes the essential features and functions required of an Integrated Digital Services Network for the purpose of providing a single integrated common-user communication system.

5.1.2 Requirements. The vendor shall provide circuit switched equipment and systems for common-user services which shall conform to the requirements outline in reference 3.2 to provide voice, data, video and facsimile services to Army users. The equipments and systems provided shall be capable of unencumbered enhancement and modification as new services associated with the ISDN shall be defined and become available.

##### 5.1.3 Definitions.

5.1.4 Integration. (Describe principal interfaces within the IMA between this acquisition and other IMA system components).

5.1.5 Interoperability. (Describe functional compatibilities of languages, operating systems and the like).

5.1.6 Characteristics.

5.1.7 Performance. (Describe in terms of services to be provided and functions to be performed.

5.1.8 Security. (Describe security requirements in the interoperability environment, if required. (If none , so state).)

5.2 Quality Assurance.

5.2.1 The Government will explicitly determine compliance with IMA standards for this acquisition. Compliance evaluation may include, as appropriate, the following:

5.2.1.1 Independent use of certification procedures.

5.2.1.2 Independent operating tests in actual or simulated environments.

5.2.1.3 Observance of contractor test procedures or certification procedures during and/or following production.

5.2.1.4 Contractor certificates of compliance.

5.2.1.5 Et Seq. Other requirements as may be deemed necessary by the acquisition authority.

5.3 Instructions for preparation of technical proposals. Offerers shall address, in a separate section of the technical proposal, the IMA standards for the interoperability and integration. This section shall include, but is not limited to.

5.3.1 Detailed description of the characteristics of the products offered which fully comply with the IMA standards.

5.3.2 Test plans for demonstrating full compliance with the standards.

5.3.3 Identification of certification procedures to be used to demonstrate compliance with IMA standards. Certification procedures and quality assurance shall be as specified in the solicitation. At a minimum, the vendor shall be required to demonstrate that his product or solution conforms to the solicitation and the Army Information Architecture. Preference shall be given to use of goods and services which have been tested as compliant and conformant based upon testing performed by an agency recognized under the National Bureau of Standards National Voluntary Laboratory Accreditation Program, or other recognized non-profit testing activity.

## ANNEX C MODULATORS/DEMULATORS (MODEMS)

1. Effective Date. TBD

2. Applicable to:

- a. Tier(s) 1,2, and 3
- b. All new IMA systems acquisitions.
- c. Existing IMA systems for upgrades.

3. Reference Documents.

3.1 Government Documents.

- a. FED-STD 1005 Coding and Modulation Requirements for 2400 bit/second Modems
- b. FED-STD 1006 Coding and Modulation Requirements for 4800 bits/second Modems
- c. FED-STD 1008 Coding and Modulation Requirements for Duplex 600 and 1200 bits/second Modems

3.2 NonGovernment Documents.

a. 300 bps - Applicable standards are Bell 103 and CCITT V.21.

b. 1200 bps - Applicable standards are Bell 212A, CCITT V.22, and CCITT V.22 bis (bis suffix indicates that this is the second iteration of that standard), and CCITT V.24.

c. 2400 bps - Applicable standards are Bell 212A, CCITT V.22 bis, CCITT V.24 .

d. 4800 bps - Applicable standard is CCITT V.27 ter

e. 9600 bps - Applicable standard is CCITT V.32. (Note: To date, there is no CCITT standard set for ASYNC 9600 bps FDX modems. Because each manufacturer uses a difference protocol, 9600 bps asynchronous modems (including V.32) from one manufacturer are not compatible with those from another manufacturer. Until an async standard is adapted, users must have the same modem type and manufacturer at both ends of a link).

4. Discussion.

4.1 Purpose of standards. To obtain required interoperability and integration of IMA systems and components (within) (between) the Tier(s) stated in 2 above.

4.2 Background. The standards cited here and the accompanying text will be used to select and specify modems when information systems are required to interface via voice-grade circuits.

5. Text for Solicitation.

5.1 Specification. The following table and explanations will be used to select the appropriate modem for an acquisition.



SPEED	CCITT	BELL	DUP	2-W	4-W	SYNC	LINE
200 (1)	V.21		Fdx	Fdx		Async	P
300 (a)		103	Fdx			Async	P
300 (b)(c)		108		Fdx/Hdx	Fdx/Hdx	Async	P
300		113	Fdx	Fdx		Async	P
1200 (2)(3)	V.22		Fdx	Fdx		A / S	P
1200 (d)(e)		202	Hdx	Hdx	Fdx	A / S	P
1200 (f)(g)		212A	Fdx			A / S	P
1200 (6)	V.23		Hdx	Hdx		A / S	P
2400 (4)(5)	V.22 bis		Fdx	Fdx		A / S	P
2400 (h)		201B		Hdx	Fdx	Sync	P
2400 (i)		201C	Hdx			Sync	P
2400 (7)(8)	V.26			Hdx	Fdx	Sync	P,M
2400 (10)	V.26 bis		Hdx	Hdx		Sync	P
2400 (11)	V.26 ter		Fdx	Fdx		Sync	P
4800 (12)	V.27			Hdx	Fdx	Sync	P,M
4800 (13)	V.27 bis			Hdx	H/Fdx	Sync	P,M
4800	V.27 ter		Hdx	Hdx		Sync	P
4800		208A		Hdx/Fdx	Fdx	Sync	P,M
4800		208B	Hdx			Sync	P,M,D1
9600 (14)	V.29			Hdx	Fdx	Sync	P,M (15)
9600 (16)	V.32		Fdx			Sync	
14,400 (17)	V.33			Hdx	Fdx	Sync	P (9)

Table 5.1 -- Modem Standards and Properties

bps = bits per second

Hdx = half duplex

Fdx = full duplex

P = Point-to-point

M = Multipoint

Async = Asynchronous

Sync = Synchronous

Table 5.1a -- Legend for Table 5.1

- (1) May be operated as a HDX modem.
  - (2) Operationally compatible with AT&T 212A, except at 0-300 and 600 bps fallback speeds.
  - (3) Alternative A: 1200 bps synchronous operation with 680 bps synchronous operation optional.  
Alternative B: 1200 bps synchronous and 1200 bps asynchronous, with 600 bps synchronous/asynchronous optional.  
Alternative C: Same as alternative B, but adds 0-300bps asynchronous or synchronous (anisochronously) operation.
  - (4) 2400 bps QAM, 1200 bps DPSK, V.22 and 212A compatible. Has automatic handshake/speed fallback for operating modem.
  - (5) Loop 2 diagnostics added
  - (6) FSK modulation. 75 baud reserve channel optional. Internal clock for asynchronous operations optional.
  - (7) Phase shift layering; optional 75 baud reverse channel. Similar to AT&T 208A
  - (8) Alternative A: 0-9-180-270 deg phase change angles Alternative B: 45-135-225-315 deg phase change angles
  - (9) M.1020 conditioning recommended (Corresponds to AT&T C1)
  - (10) 1200 bps fallback speed. 75 baud reverse channel. Uses Alternative B signaling scheme.
  - (11) Uses echo cancellation technique.
  - (12) 2400 bps fallback speed for all V.27 types. 75 baud reverse channel optional
  - (13) Optical 75 baud reverse channel. Has fast training capability.
  - (14) Optional 4-channel multiplexer available. 4800 bps and 2400 bps fallback speeds
  - (15) M.1020 or M.1025 conditioning recommended
  - (16) 9600 bps in uncoded QAM, or Trellis-coded QAM. 4800 bps fallback speeds.
  - (17) 12K bps fallback speed. Trellis-coded. 6-channel multiplexer option available.
- 
- (a) 103j is originate/answer with autoanswer
  - (b) 108f, G have RS-232C interface and two- or four-wire connections.
  - (c) 108H, J have 20ma current loop interface
  - (d) 202S supports 1800 bps on private line with C2 conditioning, Autoanswer and synchronous capability standard. Reverse channel optional.
  - (e) 202T is the same as 202S, but with manual operation.
  - (f) 212A adds scrambler-kicker to avoid occasional data lockup experienced with earlier 212 modems. Includes 300 bps operation in 103J-compatible mode.
  - (g) Defines EIA interface to be similar (functionally compatible) with CCITT recommendations V.24.
  - (h) PSK modulation
  - (i) Multiplexing and fast-training options available

Table 5.1b -- Keys for Table 5.1

**5.1.1 Scope.** This specification establishes the interoperability and integration requirements for the modems required to interface information systems to voice-grade networks for the Information Mission Area (IMA).

**5.1.2 Requirements.** The vendor shall provide the appropriate interface device for voice-grade networks based upon the above criteria and other criteria as may be found elsewhere in the solicitation.

#### **Note To Acquisition Authorities**

It is imperative that acquisition authorities also consider host nation requirements for interface to the public switched telephone network. Compliance to the above standards does not insure the user of access to these networks. In particular, the authority should consider the requirements of the Deutsch Bundespost and US requirements per public law in Part 68 of the Federal Communications Commission Regulations.

**5.1.3 Definitions.**

**5.1.4 Integration.** (Describe principal interfaces within the IMA between this acquisition and other IMA system components).

**5.1.5 Interoperability.** (Describe functional compatibilities of languages, operating systems and the like).

**5.1.6 Characteristics.**

**5.1.7 Performance.** (Describe in terms of services to be provided and functions to be performed).

**5.1.8 Security.** (Describe security requirements in the interoperability environment, if required. If none, so state).

**5.2 Quality Assurance.**

**5.2.1** The Government will explicitly determine compliance with IMA standards for this acquisition. Compliance evaluation may include, as appropriate, the following:

**5.2.1.1** Independent use of certification procedures.

**5.2.1.2** Independent operating tests in actual or simulated environments.

**5.2.1.3** Observance of contractor test procedures or certification procedures during and/or following production.

**5.2.1.4** Contractor certificates of compliance.

**5.2.1.5 Et Seq.** Other requirements as deemed necessary for the acquisition authority.

**5.3 Instructions for preparation of technical proposals.** Offerers shall address, in a separate section of the technical proposal the IMA standards for the interoperability and integration. This section shall include, but is not limited to:

5.3.1 Detailed description of the characteristics of the products offered which fully comply with the IMA standards.

5.3.2 Test plans for demonstrating full compliance with the standards.

5.3.3 Identification of certification procedures to be used to demonstrate compliance with IMA standards.

## ANNEX D LOCAL AREA NETWORKS (LAN)

1. Effective Date. TBD

2. Applicable to:

- a. Tier(s) 1, 2, and 3
- b. All new IMA systems acquisitions.
- c. Existing IMA systems for upgrades.

3. Reference Documents.

3.1 Government Document none

3.2 Non-Government Documents.

- a. IEEE 802.3 Local Network for Computer Interconnection (CSMA/CD)
- b. IEEE 802.3C Local Area Networks: Repeater Unit
- c. IEEE 802.3D Medium Attachment Unit and Baseband Medium Specification for Fiber Optic Inter-Repeater Unit
- d. IEEE 802.3E Physical Signaling, Medium Attachment and Baseband Medium Specification Type 1Base5
- e. EIA TR 41-8 Premises Wiring

4. Discussion.

4.1 Purpose of standards. To obtain required interoperability and integration of IMA systems and components (within) (between) the Tier(s) stated in 2 above.

4.2 Background. This annex describes the interface and medium requirements for local area networks for communicating computer architectures, using premises wiring systems.

5. Text for Solicitation.

5.1 Specification.

5.1.1 Scope. This specification establishes the interoperability and integration requirements for the data communications for the Information Mission Area (IMA).

5.1.2. Requirements. The vendor shall provide local area networks between computing systems and equipment utilizing premises wiring systems conforming to the provisions of reference 3.2.e, and communicating using the interconnection protocol defined in reference 3.2.a. The remaining standards cited in 3.2 shall be used when the network must extend beyond the limits of reference 3.2.e.

5.1.3 Definitions.

5.1.4 Integration. (Describe principal interfaces within the IMA between this acquisition and other IMA system components).

5.1.5 Interoperability. (Describe functional compatibilities of languages, operating systems and the like).

5.1.6 Characteristics.

5.1.7 Performance. (Describe in terms of services to be provided and functions to be performed).

5.1.8 Security. (Describe security requirements in the interoperability environment, if required. If none, so state).

5.2 Quality Assurance.

5.2.1 The Government will explicitly determine compliance with IMA standards for this acquisition. Compliance evaluation may include, as appropriate, the following:

5.2.1.1 Independent use of certification procedures.

5.2.1.2 Independent operating tests in actual or simulated environments.

5.2.1.3 Observance of contractor test procedures or certification procedures during and/or following production.

5.2.1.4 Contractor certificates of compliance.

5.2.1.5 Et Seq. Other requirements as deemed necessary for the acquisition authority.

5.3 Instructions for preparation of technical proposals. Offerers shall address, in a separate section of the technical proposal the IMA standards for interoperability and integration. This section shall include, but is not limited to.

5.3.1 Detailed description of the characteristics of the products offered which fully comply with the IMA standards.

5.3.2 Test plans for demonstrating full compliance with the standards.

5.3.3 Identification of certification procedures to be used to demonstrate compliance with IMA standards.

## APPENDIX B

### IMPLEMENTATION GUIDANCE FOR AUTOMATION

**B1 Automation.** Three Tier configuration requires information systems that support the sharing of resources and the exchange of information horizontally and vertically. The information systems must support Army organizations in many diverse locations and environments. Additionally, the successful sharing of resources and information across the heterogeneous population of Army information systems requires the establishment of standards for interoperability, and the control of systems configurations and operating procedures. To those ends, the automation strategy is focused on the use of common interfaces and open system standards.

**B2 Interoperable Information Systems Concept.** Interoperability between information systems is essential for controlling costs and for providing increased automation support and productivity. Information is a vital asset and must be accessible to all elements of the Army having a need to use it. Interoperability will allow information to be exploited as a resource to enhance mission effectiveness and efficiency in both wartime and peacetime. The use of standards for interoperability will enable information to be treated as a shared, planned, managed, and controlled resource.

**B2.1 Strategic.** Strategic information systems deal largely with classified information. New technology being brought into the command and control (C2) process is aimed at providing automated workstations, digital long-haul communications, local area networks (LANs), and efficient software to support the

dynamic C2 environment. This technology will result in improved security, survivability, and interoperability and facilitate the sharing of information as needed with Sustaining Base and Theater/Tactical systems. This increased capability will, in turn, provide military leaders with better and more timely information with which to control their forces.

**B2.2 Sustaining Base.** The Sustaining Base is supported by the Army Standard Information Management System (ASIMS), supporting forty-seven (47) Army installations with five (5) regional centers. The regional centers process and store data for Army standard applications, some major command standard systems, and installation-unique systems. The ASIMS regional centers are the nucleus of first tier Regional Service Centers (RSCs), and will provide data processing capabilities in support of functional areas

in all environments. Improved interoperability will provide the Sustaining Base with the information required to plan accurately and to respond in a more timely manner to increasingly volatile support requirements.

**B2.3 Theater/Tactical.** Within the Theater/Tactical environment, the challenge is to influence the battle by developing comprehensive, flexible, and interoperable information systems that share information horizontally as well as vertically. Improved interoperability will enhance the two-way information flow between the battlefield and the Sustaining Base, providing more timely information concerning personnel, supplies, enemy situations, friendly situations, and status of reserves. It is this more rapid and accurate flow of information to decision makers across the Army that will make the investment in interoperable information systems worthwhile.



**B3 Standards for Interoperability.** Information systems currently on the drawing boards and those being developed and fielded are designed to cut across the Strategic, Sustaining Base, and Theater/Tactical environments, allowing interoperability in all functional areas. This is accomplished by the use of common interfaces and open system standards which are developed by public standards bodies and supported by the vendor community. The International Organization for Standardization (ISO), American National Standards Institute (ANSI), Institute of Electrical and Electronics Engineers (IEEE) and other bodies are working to define standards to enable interoperability between computers in multivendor environments. It is the Army objective to determine those standards best suited to their requirements and to adopt those standards when commercially available and proven.

**B4 Migration/Transition.** The Army IMA standards will facilitate a migration of the IMA to an operating posture where information system resources and data can be shared across all tiers and environments. That capability for sharing is essential for efficient and affordable response to the explosive growth in demand for increased automation support and productivity. An evolutionary process is required to move from current information systems to the information systems of the objective configuration. This process must capitalize on existing investments, accommodate technological and availability limitations, and be affordable. Because a significant capital investment exists in vendor proprietary systems, the migration/transition must consider methods of implementing the objectives without scrapping that investment. Therefore, as an interim measure, implementation of the standards set forth may require the use of gateways to convert between the various vendor proprietary standards and the open system standards.

**B4.1 Objective.** The Army's objective is to allow resources and data in any one system to be made available to any other system in a timely manner and to transition from the current baseline to this state.

**B4.2 Security.** Classified information will be protected by existing standards developed by the National Computer Security Center (NCSC) and the National Bureau of Standards (NBS) until multi-level security is feasible.

**B4.3 Transition Example.** Use of the Computer Graphics Metafile standard (ISO/DIS 8632) will promote portability of graphics data between systems and across tiers. This portability allows for the exchange of information that will enable Army users and installations to reduce or eliminate the time spent reprocessing and regenerating that data. Additionally, the Metafile standard will provide for archiving of graphics data and facilitate distributed graphics environments by allowing for off-site printing and plotting of graphics data. For future procurements, the Army can mandate that delivered systems support this graphics data interchange standard. For the large inventory of software already in the installed base, however, the problem is not as easily solved. Where the Army decides that there is a requirement for a currently installed system to exchange graphics data with other systems, the software for that system will have to be upgraded to support the Metafile standard. One transition strategy available to the Army would be the use of "import/export" utility functions which map data from and into the standard format, thus allowing for graphics data interchange.

**B5 Standards.** Standards for Automation are contained in Annexes A through L which follow. Each annex provides the framework and guidance for the application and use of the identified standards for each service for which the annex is prepared.



**IMA STANDARDS IMPLEMENTATION  
ANNEX A  
Graphics Interface**

**1. Effective date: TBD**

**2. Applicable to:**

- a. Tier (s). 1, 2 and 3**
- b. All new IMA system acquisitions.**
- c. Existing IMA systems for upgrades.**

**3. Reference Documents.**

**3.1. Government Documents.**

**3.2 Non-Government Documents.**

**ANSI X3.16-198x Computer Graphics Interface**

**4. Discussion.**

**4.1 Purpose of standards.** To obtain required interoperability and integration of IMA systems and components within and between the tiers of the Army Information Architecture as defined above in paragraph 2.

**4.2 Background.** Information systems today often produce graphics as part of the applications program output. In order to produce those graphics in a man-usable form, a method is needed to describe the characteristics of the graphic to an output device in order that the graphic can be displayed or printed

**5. Text for Solicitation.**

**5.1 Specification:**

**5.1.1. Scope:** This specification defines the graphics output requirements for information systems interfaces.

**5.1.2. Requirements:** The offeror shall provide interfaces between processes and output devices for the display of graphic and image information to display units and printing devices. These interfaces shall conform to the Computer Graphics Interface defined in reference 3.2

**5.1.3 Definitions:**

**5.1.4 Integration:** (describe principal interfaces within the IMA between this acquisition and other IMA system components).

**5.1.5 Interoperability:** (describe functional compatibilities of languages, operating systems and the like).

**5.1.6. Characteristics:**

5.1.7 Performance: (describe in terms of services to be provided and functions to be performed).

5.2 Security: (describe security requirements in the interoperability environment, if required. (if none , so state).

5.2.1. Quality Assurance.

5.2.1.1. The Government will explicitly determine compliance with IMA standards for this acquisition. Compliance evaluation may include, as appropriate, the following:

5.2.1.1.1 Independent use of certification procedures.

5.2.1.1.2 Independent operating tests in actual or simulated environments.

5.2.1.1.3 Observance of contractor test procedures or certification procedures during and/or following production.

5.2.1.1.4 Contractor certificates of compliance.

5.2.1.1.5 Et Seq.

5.3. Instructions for preparation of technical proposals. Offerors shall address, in a separate section of the technical proposal the IMA standards for the interoperability and integration. This section shall include, but is not limited to:

5.3.1. Detailed description of the characteristics of the products offered which fully comply with the IMA standards.

5.3.2. Test plans for demonstrating full compliance with the standards.

5.3.3. Identification of certification procedures to be used to demonstrate compliance with IMA standards:

IMA STANDARDS IMPLEMENTATION  
ANNEX B  
Character Sets

1. Effective date: TBD

2. Applicable to:

- a. Tier (s). 1, 2 and 3
- b. All new IMA system acquisitions.
- c. Existing IMA systems for upgrades.

3. Reference Documents.

3.1. Government Documents.

3.2 Non-Government Documents.

ANSI X3.4 American National Standard for 7-bit Code For Information Interchange

4. Discussion.

4.1 Purpose of standards. To obtain required interoperability and integration of IMA systems and components within and between the tiers of the Army Information Architecture as defined above in paragraph 2.

4.2 Background. One barrier to interoperability is the use of dissimilar methods for representing information. The use of a single coding scheme for the source coding and subsequent representations of information in a system promotes interoperability by removing that barrier. Otherwise extra processing is required to translate between representations.

5. Text for Solicitation.

5.1 Specification:

5.1.1. Scope: This specification defines the use of a standard coding scheme for the representation and interchange of information.

5.1.2. Requirements: The vendor shall include the character set commonly referred to as 7-bit ASCII as defined in reference 3.2 as the method for the source coding and representation of information.

5.1.3 Definitions:

5.1.4 Integration: (describe principal interfaces within the IMA between this acquisition and other IMA system components).

5.1.5 Interoperability: (describe functional compatibilities of languages, operating systems and the like).

**5.1.6. Characteristics:**

**5.1.7 Performance:** (describe in terms of services to be provided and functions to be performed.

**5.2 Security:** (describe security requirements in the interoperability environment, if required. (if none , so state).

**5.2.1. Quality Assurance.**

**5.2.1.1. The Government will explicitly determine compliance with IMA standards for this acquisition. Compliance evaluation may include, as appropriate, the following:**

**5.2.1.1.1 Independent use of certification procedures.**

**5.2.1.1.2 Independent operating tests in actual or simulated environments.**

**5.2.1.1.3 Observance of contractor test procedures or certification procedures during and/or following production.**

**5.2.1.1.4 Contractor certificates of compliance.**

**5.2.1.1.5 Et Seq.**

**5.3. Instructions for preparation of technical proposals. Offerors shall address, in a separate section of the technical proposal the IMA standards for the interoperability and integration. This section shall include, but is not limited to:**

**5.3.1. Detailed description of the characteristics of the products offered which fully comply with the IMA standards.**

**5.3.2. Test plans for demonstrating full compliance with the standards.**

**5.3.3. Identification of certification procedures to be used to demonstrate compliance with IMA standards:**

IMA STANDARDS IMPLEMENTATION  
ANNEX C  
Magnetic Tape Cartridges

1. Effective date: TBD

2. Applicable to:

- a. Tier (s). 2 and 3
- b. All new IMA system acquisitions.
- c. Existing IMA systems for upgrades.

3. Reference Documents.

3.1. Government Documents. none

3.2 Non-Government Documents.

Half-inch magnetic tape cartridges

HI/TC-1 Format specification for information interchange on an 0.500-inch magnetic tape cartridge at 12,690 bits per inch (240 megabyte capacity)

HI/TC-5 Format specification for information interchange on an 0.500-inch magnetic tape cartridge at 25,380 bits per inch (480 megabyte capacity)

Quarter-inch magnetic tape cartridges

QIC-24 Standard for data interchange on streaming 1/4 inch magnetic tape cartridge using group code recording at 10,000 flux reversals per inch

QIC-40 Standard for 40 megabyte, 20 track 10,000 bpi (384 bpmm) mfm encoded flexible disk controller compatible recording format for information interchange using 1/4 inch (0.630 mm) magnetic tape mini data cartridge tape drives.

QIC-100 Tape format specification for data interchange on 0.250 inch magnetic tape (DC-2000) data cartridges using group code recording at 12,500 frpi.

QIC-120 Serial recorded magnetic tape cartridge for information interchange, fifteen track, 0.250 inch (0.630 mm) 10,000 bpi (384 bpmm) streaming mode group code recording.

QIC-150 Serial recorded magnetic tape cartridge for information interchange, eighteen track, 0.250 inch (0.630 mm) 10,000 bpi (684 bpmm) streaming mode group code recording.

QIC-320 Serial recorded magnetic tape cartridge for information interchange (26 track, 20,000 frpi, gcr, ecc).

Copies of these specifications are available through Freeman Associates, 311 East Carrillo Street, Santa Barbara CA 93101. This organization acts as facilitator for the Working Group for Half Inch Tape Cartridges and the Working Group for Quarter Inch Cartridges.

4. Discussion.

4.1 Purpose of standards. To obtain required interoperability and integration of IMA systems and components within and between the tiers of the Army Information Architecture as defined above in paragraph 2.



4.2 Background. the Army needs the ability to move mass amounts of information between systems and a method for archival storage of information. Magnetic tape is a suitable medium for the recording of such information and subsequent transfer or archival storage.

## 5. Text for Solicitation.

### 5.1 Specification:

5.1.1. Scope: This specification defines requirements for magnetic tape storage systems for micro- and minicomputer systems.

5.1.2. Requirements: The contractor shall provide a magnetic storage capability which conforms to the requirements outlined in reference 3.2.

#### NOTE TO ACQUISITION AUTHORITIES

The acquisition of a magnetic tape storage system must be based upon the anticipated transfer and archival capacity required by the application. The standards specified in 3.2 cover a wide range of recording capacities. Therefore, the standard specified in the procurement will be that which best supports the requirements of that procurement.

### 5.1.3 Definitions:

5.1.4 Integration: (describe principal interfaces within the IMA between this acquisition and other IMA system components).

5.1.5 Interoperability: (describe functional compatibilities of languages, operating systems and the like).

### 5.1.6. Characteristics:

5.1.7 Performance: (describe in terms of services to be provided and functions to be performed).

5.2 Security: (describe security requirements in the interoperability environment, if required. (if none , so state).

### 5.2.1 Quality Assurance.

5.2.1.1 The Government will explicitly determine compliance with IMA standards for this acquisition. Compliance evaluation may include, as appropriate, the following:

5.2.1.1.1 Independent use of certification procedures.

5.2.1.1.2 Independent operating tests in actual or simulated environments.

5.2.1.1.3 Observance of contractor test procedures or certification procedures during and/or following production.

5.2.1.1.4 Contractor certificates of compliance.

5.2.1.1.5 Et Seq.

5.3. Instructions for preparation of technical proposals. Offerors shall address, in a separate section of the technical proposal the IMA standards for the interoperability and integration. This section shall include, but is not limited to:

5.3.1. Detailed description of the characteristics of the products offered which fully comply with the IMA standards.

5.3.2. Test plans for demonstrating full compliance with the standards.

5.3.3. Identification of certification procedures to be used to demonstrate compliance with IMA standards:

IMA STANDARDS IMPLEMENTATION  
ANNEX D  
Optical Storage

1. Effective date: TBD

2. Applicable to:

- a. Tier (s).1, 2 and 3
- b. All new IMA system acquisitions.
- c. Existing IMA systems for upgrades.

3. Reference Documents.

3.1. Government Documents.

NONE

3.2 Non-Government Documents.

ANS Z39.60-198x Volume and File Structure for CD-ROM for Information Interchange

ANS X3.129-1987 Intelligent Processor Interface

4. Discussion.

4.1 Purpose of standards. To obtain required interoperability and integration of IMA systems and components within and between the tiers of the Army Information Architecture as defined above in paragraph 2.

4.2 Background. The Army proposes that future distribution of some publications and the use of some mapping displays be via optical storage devices. Data bases consisting of text and images will be prepared at a tier-1 activity and distributed to tier-2 and tier-3 activities.

5. Text for Solicitation.

5.1 Specification:

5.1.1. Scope: This specification defines requirements for an optical disc storage function for information systems.

5.1.2. Requirements: The offeror shall provide optical data retrieval devices conforming to the mechanical, logical, and optoelectrical characteristics defined in reference 3.2a and interfacing with information systems in accordance with the mechanical, electrical and functional requirements defined in reference 3.2b.

5.1.3 Definitions:

5.1.4 Integration: (describe principal interfaces within the IMA between this acquisition and other IMA system components).

5.1.5 Interoperability: (describe functional compatibilities of languages, operating systems and the like).

5.1.6. Characteristics:

5.1.7 Performance: (describe in terms of services to be provided and functions to be performed.

5.2 Security: (describe security requirements in the interoperability environment, if required. (if none , so state).

5.2.1. Quality Assurance.

5.2.1.1. The Government will explicitly determine compliance with IMA standards for this acquisition. Compliance evaluation may include, as appropriate, the following:

5.2.1.1.1 Independent use of certification procedures.

5.2.1.1.2 Independent operating tests in actual or simulated environments.

5.2.1.1.3 Observance of contractor test procedures or certification procedures during and/or following production.

5.2.1.1.4 Contractor certificates of compliance.

5.2.1.1.5 Et Seq.

5.3. Instructions for preparation of technical proposals. Offerors shall address, in a separate section of the technical proposal the IMA standards for the interoperability and integration. This section shall include, but is not limited to:

5.3.1. Detailed description of the characteristics of the products offered which fully comply with the IMA standards.

5.3.2. Test plans for demonstrating full compliance with the standards.

5.3.3. Identification of certification procedures to be used to demonstrate compliance with IMA standards:

**IMA STANDARDS IMPLEMENTATION  
ANNEX E  
Custom Microcomputer Processor Busses**

**1. Effective date: TBD**

**2. Applicable to:**

- a. Tier (s).2 and 3**
- b. All new IMA system acquisitions.**
- c. Existing IMA systems for upgrades.**

**3. Reference Documents.**

**3.1. Government Documents.**

**3.2 Non-Government Documents.**

**IEEE Standard P-1014, Standard for a Versatile Backplane Bus (VMEbus)**

**4. Discussion.**

**4.1 Purpose of standards.** To obtain required interoperability and integration of IMA systems and components within and between the tiers of the Army Information Architecture as defined above in paragraph 2.

**4.2 Background.** There are requirements within the Army, particularly in the tactical arena where environmental considerations do not permit use of commercial-off-the-shelf equipment. In such cases custom busses may be used to construct microprocessor systems which are ruggedized against the elements.

**5. Text for Solicitation.**

**5.1 Specification:**

**5.1.1. Scope:** this specification outlines the requirements for microprocessor-based systems intended for use in hostile environments such as those found in combat areas or manufacturing environments.

**5.1.2. Requirements:** The vendor shall provide a microprocessor-based system constructed on an electrical platform conforming to the requirements outlined in reference 3.2 for microprocessor backplane busses and incorporating those preventive measures for shock, temperature, humidity, exposure to corrosive elements, etc as outlined elsewhere in this specification.

**5.1.3 Definitions:**

**5.1.4 Integration:** (describe principal interfaces within the IMA between this acquisition and other IMA system components).

**5.1.5 Interoperability:** (describe functional compatibilities of languages, operating systems and the like).

**5.1.6. Characteristics:**

**5.1.7 Performance:** (describe in terms of services to be provided and functions to be performed.

**5.2 Security:** (describe security requirements in the interoperability environment, if required. (if none , so state).

**5.2.1. Quality Assurance.**

**5.2.1.1.** The Government will explicitly determine compliance with IMA standards for this acquisition. Compliance evaluation may include, as appropriate, the following:

**5.2.1.1.1** Independent use of certification procedures.

**5.2.1.1.2** Independent operating tests in actual or simulated environments.

**5.2.1.1.3** Observance of contractor test procedures or certification procedures during and/or following production.

**5.2.1.1.4** Contractor certificates of compliance.

**5.2.1.1.5** Et Seq.

**5.3.** Instructions for preparation of technical proposals. Offerors shall address, in a separate section of the technical proposal the IMA standards for the interoperability and integration. This section shall include, but is not limited to:

**5.3.1.** Detailed description of the characteristics of the products offered which fully comply with the IMA standards.

**5.3.2.** Test plans for demonstrating full compliance with the standards.

**5.3.3.** Identification of certification procedures to be used to demonstrate compliance with IMA standards:

**IMA STANDARDS IMPLEMENTATION  
ANNEX F  
Peripheral Busses**

1. Effective date: TBD

2. Applicable to:

- a. Tier (s). 2 and 3
- b. All new IMA system acquisitions.
- c. Existing IMA systems for upgrades.

3. Reference Documents.

3.1. Government Documents.

NONE

3.2 Non-Government Documents.

ANS X3.129 Intelligent Peripheral Interface

4. Discussion.

4.1 Purpose of standards. To obtain required interoperability and integration of IMA systems and components within and between the tiers of the Army Information Architecture as defined above in paragraph 2.

4.2 Background. In order to increase economic interoperability among peripheral devices used at tiers 2 and 3 a method is needed which allows a generic interface for storage devices attached to processors. This interface must address the electrical, functional and mechanical connections necessary to allow data transfer.

5. Text for Solicitation.

5.1 Specification:

5.1.1. Scope: This specification defined the electrical, mechanical, and functional interconnection requirements between processors and external or add-on storage devices (tape, disk, etc.)

5.1.2. Requirements: The vendor shall provide peripheral devices for auxiliary storage which conform to the requirements outlined in reference 3.2 for interface.

5.1.3 Definitions:

5.1.4 Integration: (describe principal interfaces within the IMA between this acquisition and other IMA system components).

5.1.5 Interoperability: (describe functional compatibilities of languages, operating systems and the like).

5.1.6. Characteristics:

5.1.7 Performance: (describe in terms of services to be provided and functions to be performed.

5.2 Security: (describe security requirements in the interoperability environment, if required. (if none , so state).

5.2.1. Quality Assurance.

5.2.1.1. The Government will explicitly determine compliance with IMA standards for this acquisition. Compliance evaluation may include, as appropriate, the following:

5.2.1.1.1 Independent use of certification procedures.

5.2.1.1.2 Independent operating tests in actual or simulated environments.

5.2.1.1.3 Observance of contractor test procedures or certification procedures during and/or following production.

5.2.1.1.4 Contractor certificates of compliance.

5.2.1.1.5 Et Seq.

5.3. Instructions for preparation of technical proposals. Offerors shall address, in a separate section of the technical proposal the IMA standards for the interoperability and integration. This section shall include, but is not limited to:

5.3.1. Detailed description of the characteristics of the products offered which fully comply with the IMA standards.

5.3.2. Test plans for demonstrating full compliance with the standards.

5.3.3. Identification of certification procedures to be used to demonstrate compliance with IMA standards:



**IMA STANDARDS IMPLEMENTATION  
ANNEX G**

**Portable Operating System Interface For computer Environments (POSIX)**

**1. Effective date: TBD**

**2. Applicable to:**

- a. Tier (s).1, 2 and 3
- b. All new IMA system acquisitions.
- c. Existing IMA systems for upgrades.

**3. Reference Documents.**

**3.1. Government Documents.**

**NONE**

**3.2 Non-Government Documents.**

**IEEE Trial Use Standard 1003.1 Portable Operating System Interface for Computer Environments (POSIX)**

**4. Discussion.**

**4.1 Purpose of standards.** To obtain required interoperability and integration of IMA systems and components within and between the tiers of the Army Information Architecture as defined above in paragraph 2.

**4.2 Background.** Interoperability is enhanced if a method exists to transport applications from one system to a dissimilar system. If the same source code can be used on dissimilar systems, then one can be better assured that the application will function as identically as the dissimilar systems will allow. If the application had to be recoded in another source language, then one assumes a greater risk of operational dissimilarity.

**5. Text for Solicitation.**

**5.1 Specification:**

**5.1.1. Scope:** This specification defines the use of a standard operating system interface for applications programs

**5.1.2. Requirements:** The contractor shall provide an operating system interface for applications programs which conforms to the requirements for a Portable Operating systems interface for Computer Environment (POSIX) as defined in reference 3.2.

**5.1.3 Definitions:**

5.1.4 Integration: (describe principal interfaces within the IMA between this acquisition and other IMA system components).

5.1.5 Interoperability: (describe functional compatibilities of languages, operating systems and the like).

5.1.6. Characteristics:

5.1.7 Performance: (describe in terms of services to be provided and functions to be performed.

5.2 Security: (describe security requirements in the interoperability environment, if required. (if none , so state).

5.2.1. Quality Assurance.

5.2.1.1. The Government will explicitly determine compliance with IMA standards for this acquisition. Compliance evaluation may include, as appropriate, the following:

5.2.1.1.1 Independent use of certification procedures.

5.2.1.1.2 Independent operating tests in actual or simulated environments.

5.2.1.1.3 Observance of contractor test procedures or certification procedures during and/or following production.

5.2.1.1.4 Contractor certificates of compliance.

5.2.1.1.5 Et Seq.

5.3. Instructions for preparation of technical proposals. Offerors shall address, in a separate section of the technical proposal the IMA standards for the interoperability and integration. This section shall include, but is not limited to:

5.3.1. Detailed description of the characteristics of the products offered which fully comply with the IMA standards.

5.3.2. Test plans for demonstrating full compliance with the standards.

5.3.3. Identification of certification procedures to be used to demonstrate compliance with IMA standards:

IMA STANDARDS IMPLEMENTATION  
ANNEX H  
Data Base Management Systems

1. Effective date: TBD

2. Applicable to:

- a. Tier (s).1, 2 and 3
- b. All new IMA system acquisitions.
- c. Existing IMA systems for upgrades.

3. Reference Documents.

3.1. Government Documents.

NONE

3.2 Non-Government Documents.

ANSI X3.135.1986 Database language SQL

4. Discussion.

4.1 Purpose of standards. To obtain required interoperability and integration of IMA systems and components within and between the tiers of the Army Information Architecture as defined above in paragraph 2.

4.2 Background. Many information systems use data bases to file related information to reduce duplicity and increase efficiency. A part of that increase in efficiency is realized by a common method for querying the data base.

5. Text for Solicitation.

5.1 Specification:

5.1.1. Scope: This specification defines the requirements for access capability into data base management systems.

Note To Acquisition Authorities: At the present time and for the foreseeable future, there are and will not be any standards specifically defining data base management systems. This specification, however, will require offerors to provide a standard method accessing and querying data base management systems.

5.1.2. Requirements: The Offeror shall provide relational data base management capability as part of his offer. That DBMS shall include the necessary bindings for the Standard Query Language as described in reference 3.2 which will permit common access and query structure of data elements.

5.1.3 Definitions:

5.1.4 Integration: (describe principal interfaces within the IMA between this acquisition and other IMA system components).

5.1.5 Interoperability: (describe functional compatibilities of languages, operating systems and the like).

5.1.6. Characteristics:

5.1.7 Performance: (describe in terms of services to be provided and functions to be performed.

5.2 Security: (describe security requirements in the interoperability environment, if required. (if none , so state).

5.2.1. Quality Assurance.

5.2.1.1. The Government will explicitly determine compliance with IMA standards for this acquisition. Compliance evaluation may include, as appropriate, the following:

5.2.1.1.1 Independent use of certification procedures.

5.2.1.1.2 Independent operating tests in actual or simulated environments.

5.2.1.1.3 Observance of contractor test procedures or certification procedures during and/or following production.

5.2.1.1.4 Contractor certificates of compliance.

5.2.1.1.5 Et Seq.

5.3. Instructions for preparation of technical proposals. Offerors shall address, in a separate section of the technical proposal the IMA standards for the interoperability and integration. This section shall include, but is not limited to:

5.3.1. Detailed description of the characteristics of the products offered which fully comply with the IMA standards.

5.3.2. Test plans for demonstrating full compliance with the standards.

5.3.3. Identification of certification procedures to be used to demonstrate compliance with IMA standards:

IMA STANDARDS IMPLEMENTATION  
ANNEX I  
Languages

1. Effective date: TBD

2. Applicable to:

- a. Tier (s).1, 2 and 3
- b. All new IMA system acquisitions.
- c. Existing IMA systems for upgrades.

3. Reference Documents.

3.1. Government Documents.

MIL-STD-1815A Ada

3.2 NonGovernment Documents

ANS X3.135.1986 Database language SQL

4. Discussion.

4.1 Purpose of standards. To obtain required interoperability and integration of IMA systems and components within and between the tiers of the Army Information Architecture as defined above in paragraph 2.

4.2 Background. In order to remove barriers to interoperability, one must seek methods of doing things which reduces differences in the way those things are done between dissimilar environments. The use of a common programming language to develop applications is one method by which this can be accomplished.

5. Text for Solicitation.

5.1 Specification:

5.1.1. Scope: This specification defines the requirements for a common programming language to be used for the development of application programs within all areas of the Army Information Architecture.

5.1.2. Requirements: The contractor shall produce and provide all applications programs associated with this procurement using the Ada programming language as defined in reference 3.1 Further, those programs thus produced shall include database query capability using bindings between Ada and SQL, reference 3.2.

5.1.3 Definitions:

5.1.4 Integration: (describe principal interfaces within the IMA between this acquisition and other IMA system components).

5.1.5 Interoperability: (describe functional compatibilities of languages, operating systems and the like).

5.1.6. Characteristics:

5.1.7 Performance: (describe in terms of services to be provided and functions to be performed.

5.2 Security: (describe security requirements in the interoperability environment, if required. (if none , so state).

5.2.1. Quality Assurance.

5.2.1.1. The Government will explicitly determine compliance with IMA standards for this acquisition. Compliance evaluation may include, as appropriate, the following:

5.2.1.1.1 Independent use of certification procedures.

5.2.1.1.2 Independent operating tests in actual or simulated environments.

5.2.1.1.3 Observance of contractor test procedures or certification procedures - during and/or following production.

5.2.1.1.4 Contractor certificates of compliance.

5.2.1.1.5 Et Seq.

5.3. Instructions for preparation of technical proposals. Offerors shall address, in a separate section of the technical proposal the IMA standards for the interoperability and integration. This section shall include, but is not limited to:

5.3.1. Detailed description of the characteristics of the products offered which fully comply with the IMA standards.

5.3.2. Test plans for demonstrating full compliance with the standards.

5.3.3. Identification of certification procedures to be used to demonstrate compliance with IMA standards: The offeror will certify that the development of such applications programs as may be provided under this procurement shall have been compiled using only those compilers that have been properly tested and certified by the Department of Defense and bear the Ada certification mark.

**IMA STANDARDS IMPLEMENTATION  
ANNEX J  
Standard Generalized Markup Language**

1. Effective date: TBD

2. Applicable to:

- a. Tier (s). 1, 2 and 3
- b. All new IMA system acquisitions.
- c. Existing IMA systems for upgrades.

3. Reference Documents.

3.1. Government Documents.

NONE

3.2 Non-Government Documents

ISO 8879 Standard Generalized Markup Language

4. Discussion.

4.1 Purpose of standards. To obtain required interoperability and integration of IMA systems and components within and between the tiers of the Army Information Architecture as defined above in paragraph 2.

4.2 Background. The preparation of documents which contain text and graphics is the bulwark of the office automation environment. In the day-to-day Army office environment, documents are created and circulated for review, comment and approval. Therefore a method is needed to electronically transfer documents between offices and staff elements without losing form or content. An Architecture is required that will insure such transfer.

5. Text for Solicitation.

5.1 Specification:

5.1.1 Scope: This specification defines the requirements for a standard generalized markup language which permits the elements of a documents to be defined according to their attributes. This capability allows documents to be transferred or used by other workers or stations without loss of content or structure.

5.1.2 Requirements: The offeror shall provide document creation and editing capability which includes document type definition (DTD) and tagging in accordance with reference 3.2. This requirement shall include DTD development capability for initial document definition and subsequent automated attachment of DTD associated tags to created documents.

5.1.3 Definitions: (procurement unique.)

5.1.4 Integration: (describe principal interfaces within the IMA between this acquisition and other IMA system components).

5.1.5 Interoperability: (describe functional compatibilities of languages, operating systems and the like).

5.1.6. Characteristics:

5.1.7 Performance: (describe in terms of services to be provided and functions to be performed.

5.2 Security: (describe security requirements in the interoperability environment, if required. (if none , so state).

5.2.1. Quality Assurance.

5.2.1.1. The Government will explicitly determine compliance with IMA standards for this acquisition. Compliance evaluation may include, as appropriate, the following:

5.2.1.1.1 Independent use of certification procedures.

5.2.1.1.2 Independent operating tests in actual or simulated environments.

5.2.1.1.3 Observance of contractor test procedures or certification procedures during and/or following production.

5.2.1.1.4 Contractor certificates of compliance.

5.2.1.1.5 Et Seq.

5.3. Instructions for preparation of technical proposals. Offerors shall address, in a separate section of the technical proposal the IMA standards for the interoperability and integration. This section shall include, but is not limited to:

5.3.1. Detailed description of the characteristics of the products offered which fully comply with the IMA standards.

5.3.2. Test plans for demonstrating full compliance with the standards.

5.3.3. Identification of certification procedures to be used to demonstrate compliance with IMA standards:



IMA STANDARDS IMPLEMENTATION  
ANNEX K  
Computer Graphics

1. Effective date: TBD

2. Applicable to:

- a. Tier (s). 1, 2 and 3
- b. All new IMA system acquisitions.
- c. Existing IMA systems for upgrades.

3. Reference Documents.

3.1. Government Documents.

NONE

3.2 Non-Government Documents.

- a. ANSI X3.16-198x Computer Graphics Interface
- b. ANSI X3.122-1986 Computer Graphics Metafile
- c. ANSI X3.144-198x Programmers' Hierarchical Interactive Graphics System (PHIGS)

4. Discussion.

4.1 Purpose of standards. To obtain required interoperability and integration of IMA systems and components within and between the tiers of the Army Information Architecture as defined above in paragraph 2.

4.2 Background. The use of graphics in information processing is increasing for the display and interpretation of information. Graphics is also being used in processing to product designs, maps charts, etc. In order to remove a barrier to interoperability, all systems should possess the same graphics capabilities. Therefore, it is necessary to establish one graphics techniques or group of related techniques as the standards for graphic representation.

5. Text for Solicitation.

5.1 Specification:

5.1.1. Scope: This specification defines the requirements for graphics processing capabilities for engineering graphics, business graphics, and graphics interchange in an Open document Architecture.

5.1.2. Requirements: The contractor shall provide graphics processing capabilities in information systems in the following manner, as appropriate:

For processing and producing graphics and image displays, the offeror shall provide the Programmers Hierarchical Interactive Graphic System in accordance with reference 3.2c.

To present that produced image or graphic on a workstation or other display, the offeror shall include the Computer Graphics Interface in accordance with reference 3.2a.

To transfer that image or graphic document between systems over a network using such facilities as the Open Document Architecture, the offeror shall provide such interfaces as are defined in reference 3.2b.

#### 5.1.3 Definitions:

5.1.4 Integration: (describe principal interfaces within the IMA between this acquisition and other IMA system components).

5.1.5 Interoperability: (describe functional compatibilities of languages, operating systems and the like).

#### 5.1.6. Characteristics:

5.1.7 Performance: (describe in terms of services to be provided and functions to be performed).

5.2 Security: (describe security requirements in the interoperability environment, if required. (if none , so state).

#### 5.2.1. Quality Assurance.

5.2.1.1. The Government will explicitly determine compliance with IMA standards for this acquisition. Compliance evaluation may include, as appropriate, the following:

5.2.1.1.1 Independent use of certification procedures.

5.2.1.1.2 Independent operating tests in actual or simulated environments.

5.2.1.1.3 Observance of contractor test procedures or certification procedures during and/or following production.

5.2.1.1.4 Contractor certificates of compliance.

5.2.1.1.5 Et Seq.

5.3. Instructions for preparation of technical proposals. Offerors shall address, in a separate section of the technical proposal the IMA standards for the interoperability and integration. This section shall include, but is not limited to:

5.3.1. Detailed description of the characteristics of the products offered which fully comply with the IMA standards.

5.3.2. Test plans for demonstrating full compliance with the standards.

5.3.3. Identification of certification procedures to be used to demonstrate compliance with IMA standards:

**IMA STANDARDS IMPLEMENTATION  
ANNEX L  
TRUSTED COMPUTING**

**1. Effective date. TBD**

**2. Applicable to:**

- a. Tiers 1, 2 and 3
- b. All new IMA system acquisitions.
- c. Existing IMA systems for upgrades.

**3. Reference Documents.**

**3.1 Government Documents.**

- a. AR 380-380, Automation Security, Headquarters, Department of the Army, 8 March 1985
- b. DIA Manual 50-4, Security of Compartmented Computer Operations (U), September 1983
- c. DOD Manual 5200.28-STD Department of Defense Trusted Computer System Evaluation Criteria, December 1985
- d. CSC-STD-002-85 Department of Defense Password Management Guideline, 12 April 1985
- e. NCSC-TG-005, Trusted Network Interpretation of the Trusted Computer System Evaluation Criteria, 31 July 1987

**3.2 NonGovernment Documents**

- a. FIPS PUB 46 (ANSI X3.92-1981) Data Encryption Standard, January 1977
- b. FIPS PUB 74 Guideline for the Implementing and Using the NBS Data Encryption Standard, April 1981
- c. FIPS PUB 81 (ANSI X3.106-1983) DES Mode of Operation, December 1980

**4. Discussion.**

**4.1 Purpose of Standards.** To obtain required interoperability and integration of IMA systems and components within and between the tiers of the Army Information Architecture as defined above in paragraph 2.

**4.2 Background.**

a. Trusted Computer System is an Automated Information System that employs sufficient hardware and software integrity measures to allow its use for processing simultaneously a range of sensitive or classified information. These systems enforce the Principle of Least Privilege and can be trusted to differentiate among various sensitivity levels of data.

b. The DoD Trusted Computer System Evaluation Criteria (TCSEC)(the Criteria) divides Trusted Computer Systems in to four divisions which are further divided into a total of seven classes. The divisions range from D (providing the least

hardware/software security) to A (providing the most Hardware/software security. Reference c. of the Government documents cited in para 3.1 above contains Figure 1 that is a chart which summarized all requirements for each class of the Criteria. NOTE; The National Computer Security Center's Information Systems Security Products and Services Catalogue lists only one hardware with an overall evaluation of A1 class, that is the HONEYWELL Information Systems, Inc., Secure Communications Processor (SCOMP).

c. Assurance requirements are the backbone of the higher classes of the Criteria. Any number of features can be added to an existing Automated Information System (AIS) with application programs or slight modifications to the operating system; however, these features can usually be circumvented rather easily. Before an AIS can be trusted to differentiate between data of different levels, it must be demonstrated that its controls cannot be easily circumvented. The Criteria sets forth requirements that, if met, make it easier to believe that the Trusted Computing Base of the system will work as claimed and cannot be circumvented.

## 5. Text for Solicitation.

### 5.1 Specification.

5.1.1 This specification establishes the essential features and functions required of a Trusted Computing System.

5.1.2 Requirements. The offeror shall provide the following Trusted Processing interoperability and integration support capabilities.

a. Security Services (Trusted Computing Base).

1. A trusted computing base (TCB) with the security features as specified for the desired level of trust in DoD Manual 5200.28

b. Password Management.

1. A password management policy in compliance with CSC-STD-002-85.

c. Encryption. This shall include:

1. The data encryption[ algorithm as specified in FIPS PUB 46 (ANSI X3.92-1981).

2. Encoding and decoding methodologies as specified in FIPS PUB 81 (ANSI X3.106-1983) with implementation guidance in FIPS PUB 74.

d. Network Security. This shall include:

1. A trusted network base with the attributes for the desired level of trust as specified in NCSC-TG-005.

e. Declassification. This shall include:

1. Declassification software in compliance with CSC-STD-005-85.

### 5.1.3 Definitions.

5.1.4 Integration. (Describe principal interfaces within the IMA between this acquisition and other IMA system components).

5.1.5 Interoperability. (Describe functional compatibilities of languages, operating systems and the like).

5.1.6 Characteristics.

5.1.7 Performance. (Describe in terms of services to be provided and functions to be performed.

5.1.8 Security. (Describe security requirements in the interoperability environment, if required. (If none, so state).)

5.2 Quality Assurance.

5.2.1 The Government will explicitly determine compliance with IMA standards for this acquisition. Compliance evaluation may include, as appropriate, the following.

5.2.1.1 Independent use of certification procedures.

5.2.1.2 Independent operating tests in actual or simulated environments.

5.2.1.3 Observance of contractor test procedures or certification procedures during and/or following production.

5.2.1.4 Contractor certificates of compliance.

5.2.1.5 Et Seq.

5.3 Instructions for preparation of technical proposals. Offerors shall address, in a separate section of the technical proposal the IMA standards for the interoperability and integration. This section shall include, but is not limited to:

5.3.1 Detailed description of the characteristics of the products offered which fully comply with the IMA standards.

5.3.2 Test plans for demonstrating full compliance with the standards.

5.3.3 Identification of certification procedures to be used to demonstrate compliance with IMA standards. Quality assurance and product testing shall be in accordance with the procedures outlined in references cited in para 3. The vendor shall give priority consideration to hardware and software which has been tested and certified by NSA and qualifies for the mark of the Corporation of Open System or other nonprofit testing and certification organization as may be deemed satisfactory by the Government.

## APPENDIX C

### IMPLEMENTATION GUIDANCE FOR RECORDS MANAGEMENT

**C1 Records Management.** The IMA subdisipline of records management is concerned with the preservation of information of importance to the Army and to the United States. A properly executed records management program insures that only the information of importance is retained.

**C2 Records Management and the Army Environment.** Records management is equally executed in the sustaining base, theater/tactical and strategic environments. There is no lesser requirement from area to area.

**C3 Migration/Transition Strategy.** Records management today is a manual paper-based system. Its procedures are based on the processing of paper records in filing cabinets. The predominant filing system is The Army Functional Filing System (TAFFS) which is being supplanted by the Modern Army Record Keeping System (MARKS). MARKS is creating an environment of record keeping driven by the authority which caused the record to be kept. The file numbers associated with the records are derived from the requiring authority. This method, while seeming to create more categories for records is of less burden than TAFFS which had no rationale for its structure. While MARKS is still a paper-based system, it can provide a viable platform for a transition to electronic record keeping.

**C4 Standards.** The technical report associated with this guidance could not make any recommendations for standards for records management. This is so for two reasons:

a. Those things in automation which could aid in the standardization of records management are still a number of years away from reality.

b. Records management for a large part is a user agent of the automation services.

The Army records management community should strive to exploit the capabilities of the IMA disciplines. To do this, it must begin the development of programs with Army-wide visibility which identify its requirements. The Modern Army Filing and Finding Aid (MAFFA) is a beginning in defining the requirements of records management, but it must go beyond its current status and be defined as a common-user utility. Its requirements must be made known to the automation subdiscipline to insure it is incorporated into the architecture.

## APPENDIX D

### IMPLEMENTATION GUIDANCE FOR VISUAL INFORMATION

**D1 Visual Information.** Visual information is the use of one or more of the various visual media with or without sound to convey information. Visual information includes still photography, motion picture photography, video recording with or without sound, graphic arts, visual aids, models, displays visual presentation services, and the processes that support them.

**D2 Interoperable Information Systems Concept.** Interoperability between information systems is essential for controlling costs and for providing increased visual information support and productivity. Information is a vital asset and must be accessible to all elements of the Army having a need to use it. Interoperability will allow information to be exploited as a resource to enhance mission effectiveness and efficiency in both wartime and peacetime. The use of standards for interoperability will enable information to be treated as a shared, planned, managed and controlled resource.

**D2.1 Sustaining Base Visual Information.** The sustaining base uses VI services to document its activities. All VI media may be used to accomplish these needs. Uses include:

- a. Use of graphic arts for briefing slides and training aids.
- b. Use of operational documentation to record events.
- c. Use of combat camera skills to record and document field exercises and war games.



d. Use of technical documentation to record events associated with research and development, logistics activities, medical activities, test and evaluation, or investigations.

D2.2 Theater/Tactical. The use of VI in the theater/tactical environment falls primarily in the combat camera category. Combat camera teams capture information concerning personnel, terrain, equipment and other information which will assist the commander in the planning and execution of his mission. VI has become an integral part of the command and control tools available to the commander. Combat camera also documents the actions of US Forces in the conduct of war. Combat camera products are used to evaluate actions, gain insight into the enemy's methods, and to document activities for historical purposes.

D2.3 Strategic. The use of VI in the strategic environment is similar to that of the theater/tactical environment; information is captured on a variety of subjects for later review and evaluation. Examples of the use of VI in strategic applications are those associated with the operation of command posts for the commanders-in-chief of the unified and specified commands.

D3 Standards for Interoperability. Visual information systems currently being considered cut across the strategic, sustaining base and theater/tactical environments, allowing interoperability in all functional areas. This is accomplished by the use of common interfaces and open system standards which are developed by public standards bodies and supported by the vendor community. The International Organization for Standardization (ISO), American National Standards Institute (ANSI), and other recognized standards bodies are working to enable interoperability between computers in multivendor environments. This is

particularly important in visual information where a goal is to exploit advances in computer technology. It is that Army objective to determine those standards best suited to their requirements and to adopt those standards when commercially available and proven.

D4 Visual Information Objectives. The Army Visual Information Management Office (AVIMO) has stated numerous objectives which are intended to modernize its efforts and improve the products for the customers. These objectives include:

- a. Upgrade the capabilities of the Visual Information Support Centers (VISC) with current technology, particularly graphic arts capabilities and provide fixed and mobile VISC capability.
- b. Develop and implement common-user video teleconferencing centers.
- c. Develop and implement computer-based instruction systems.
- d. Develop and implement a common-user visual database system.
- e. Research advances in technology to determine future trends which may be used to further enhance visual information services. These services must be interoperable with the other IMA subdisciplines of telecommunications, automation, records management, and printing and publishing.

Of these objectives, only the graphic arts capability can be standardized using the criteria established for this report. That criteria is the use of open public standards with implementation within the next two years. This report also considered facsimile as a visual information service. This service can also be standardized. For a discussion of the rationale for facsimile as a visual information service, see the technical report associated with this implementation guidance.

D5 Migration/Transition. There is no migration/transition strategy associated with visual information. The AVIMO objectives are to break new ground in visual information using new technologies. This is intended to provide the visual information customer with the best possible product.

D6 Standards. Standards for visual information are contained in Annexes A and B which follow. Each annex provides the framework and guidance for the application and use of the identified standards for each service for which the annex is prepared.

## ANNEX A GRAPHIC ARTS

1. Effective date. TBD

2. Applicable to.

- a. Tier(s) 1,2 and 3
- b. All new IMA system acquisitions.
- c. Existing IMA systems for upgrades.

3. Reference Documents.

3.1 Government Documents.

Government Open System Interconnect Profile FIPS Pub xxx

3.2 NonGovernment Documents.

- a. ISO/DP 9592 Programmer's Hierarchical Interactive Graphics System (PHIGS)
- b. ISO/DIS 8632 Computer Graphics Metafile
- c. ISO/DP 9636 Computer Graphics Interface

4. Discussion.

4.1 Purpose of standards. To obtain required interoperability and integration of IMA systems and components within and between the tiers of the Army Information Architecture as defined above in paragraph 2.

4.2 Background. The Army Visual Information Management Office has declared an objective to upgrade its services by improving its ability to produce graphic arts. The AVIMO also wants to enable the user to do more things with the product such as computer driven presentation.

5. Text for Solicitation.

5.1 Specification.

5.1.1 Scope. This specification defines the requirements for the creation, transfer, storage and presentation of graphic arts produced on automated equipment.

5.1.2 Requirements.

5.1.2.1 Creation. The offerer shall provide graphic arts generation equipment which employs the Programmer's Hierarchical Interactive Graphics Systems (PHIGS) in accordance with reference 3.2.a.

5.1.2.2 Transfer. The offerer shall include the capability to transfer graphics using the Government Open Systems Interconnect Profile in accordance with reference 3.1.

NOTE TO ACQUISITION AUTHORITIES. The GOSIP requires further profiling which is driven by the type of communications network that is being used. Interface requirements for the physical, data link, and network layers will change.

5.1.2.3 Storage. The offerer shall provide graphic arts storage and retrieval capability using the Computer Graphics Metafile in accordance with reference 3.2.b

5.1.2.4 Presentation. The offerer shall provide the needed interfaces to permit graphics to be displayed and presented using the Computer Graphics Interface in accordance with reference 3.2.c.

5.1.3 Definitions.

5.1.4 Integration. (Describe principal interfaces within the IMA between this acquisition and other IMA system components).

5.1.5 Interoperability. (Describe functional compatibilities of languages, operating systems and the like).

5.1.6. Characteristics.

5.1.7 Performance. (Describe in terms of services to be provided and functions to be performed.)

5.1.8 Security. (Describe security requirements in the interoperability environment, if required (If none, so state.).)

5.2. Quality Assurance.

5.2.1 The Government will explicitly determine compliance with IMA standards for this acquisition. Compliance evaluation may include, as appropriate, the following:

5.2.1.1 Independent use of certification procedures;

5.2.1.2 Independent operating tests in actual or simulated environments;

5.2.1.3 Observance of contractor test procedures or certification procedures during and/or following production;

5.2.1.4 Contractor certificates of compliance;

5.2.1.5 Et Seq.

5.3 Instructions for preparation of technical proposals. Offerers shall address, in a separate section of the technical proposal the IMA standards for the interoperability and integration. This section shall include, but is not limited to:

5.3.1 Detailed description of the characteristics of the products offered which fully comply with the IMA standards;

5.3.2 Test plans for demonstrating full compliance with the standards;

5.3.3 Identification of certification procedures to be used to demonstrate compliance with IMA standards.

## ANNEX B FACSIMILE

1. Effective date. TBD

2. Applicable to.

- a. Tier(s) 1,2 and 3
- b. All new IMA system acquisitions.
- c. Existing IMA systems for upgrades.

3. Reference Documents.

3.1 Government Documents.

none

3.2 NonGovernment Documents.

- a. CCITT T.4 Standardization of Group 3 Facsimile Apparatus for Document Transmission.
- b. CCITT T.5 Standardization of Group 4 Facsimile Apparatus for Document Transmission.
- c. CCITT T.21 Standardized Test Charts for Document Facsimile Transmission.

4. Discussion.

4.1 Purpose of standards. To obtain required interoperability and integration of IMA systems and components within and between the tiers of the Army Information Architecture as defined above in paragraph 2.

4.2 Background. The Army has had a requirement for many years to transmit near perfect copies of original documents. This need is satisfied by the use of facsimile machines. Recent developments in technology have increased the speed and quality of such devices.

5. Text for Solicitation.

5.1 Specification.

5.1.1 Scope. This specification defines requirements for facsimile transmission equipment.

5.1.2 Requirements.

NOTE TO ACQUISITION AUTHORITIES: Facsimile service may be used for standalone or nodal configurations, or may be part of an office document service. Each has different requirements as detailed below.

5.1.2.1 Standalone or Nodal Facsimile Service. The offerer shall provide facsimile transmission equipment to be used in standalone or nodal configurations which conform to the encoding schemes and performance requirements for Group 3 facsimile transmission in accordance with reference 3.2.a.

5.1.2.2 Office Document Facsimile. The offerer shall provide Group 4 Facsimile capability in any system offered which included Office Document Architecture Capability. The Group 4 Facsimile interface shall conform to the requirements in reference 3.2.b.

5.1.3 Definitions.

5.1.4 Integration. (Describe principal interfaces within the IMA between this acquisition and other IMA system components).

5.1.5 Interoperability. (Describe functional compatibilities of languages, operating systems and the like).

5.1.6. Characteristics.

5.1.7 Performance. (Describe in terms of services to be provided and functions to be performed.)

5.1.8 Security. (Describe security requirements in the interoperability environment, if required (If none, so state.).)

5.2. Quality Assurance.

5.2.1 The Government will explicitly determine compliance with IMA standards for this acquisition. Compliance evaluation may include, as appropriate, the following:

5.2.1.1 Independent use of certification procedures;

5.2.1.2 Independent operating tests in actual or simulated environments. The offerer shall present certificates stating that all equipment offered under this contract shall have been tested and found acceptable using the test charts and procedures contained in reference 3.2.c;

5.2.1.3 Observance of contractor test procedures or certification procedures during and/or following production;

5.2.1.4 Contractor certificates of compliance;

5.2.1.5 Et Seq.

5.3 Instructions for preparation of technical proposals. Offerers shall address, in a separate section of the technical proposal the IMA standards for the interoperability and integration. This section shall include, but is not limited to:

5.3.1 Detailed description of the characteristics of the products offered which fully comply with the IMA standards;

5.3.2 Test plans for demonstrating full compliance with the standards;

5.3.3 Identification of certification procedures to be used to demonstrate compliance with IMA standards.

## APPENDIX E PRINTING AND PUBLICATION

E1 PRINTING AND PUBLICATION. Printing and publication is concerned with providing printed materials for distribution to all ares of the Army. These printed materials may be cut sheet forms for the collection of information, may be posters and other graphics for training and command information purposes, of may be technical manuals for the operation and maintenance of Army equipment.

E2 PRINTING AND PUBLICATION IN THE ARMY ENVIRONMENT. By law, printing and publication is a commercial-industrial type activity. This is evident in that all printing needs unless classified or time critical, are procured through contracts administered by the Government Printing Office. Army has field printing offices which help satisfy those needs. While some specialized printing operations exist in the tactical environment to produce maps and printed materials for psychological warfare activities, printing and publication is a sustaining base operation.

E3. MIGRATION/TRANSITION STRATEGIES. The printing and publication mission must be viewed in two directions; that which enables the Army to gain printing services for updates and changes to technical publications; and that which allows the Army to procure new technical publications as part of the procurement of new systems. Technical publications are characterized by a long life time which will be subjected to numerous updates and changes. This then requires that the Army have a capability to readily make any needed changes and procure the printing services for those changes, and that a mechanism must exist which will allow newly procured technical publications to later undergo revision processes. The DoD Computer-aided Acquisition and Logistics System (CALS) satisfies the acquisition of new information and provides the means whereby the Army can provide



information to other contractors for subsequent procurements. By its definition and nature, CALS concepts can be leveraged to other Army areas concerned with printing and publication, such as administrative publications. Army regulations require more frequent update than technical manuals due to continuing changes in law. Therefore a system which forces uniform definition of document structure, includes a mechanism for making controlled changes and interfaces to printing and publication systems, gives the Army the means of keeping many more publications current than is now possible.

E4. STANDARDS. The conclusions reached in annex E of volume 1 of this report can be summarized in the contents of MIL-STD-1840A. When taken in toto, MIL-STD-1840A defines all the requirements for technical publications. This would not satisfy needs associated with administrative publications since the document type definitions (DTD) in MIL-M-28001 are intended specifically for technical publications. Since the Federal Acquisition Regulations require that all specifications and standards included by reference in a procurement package must be tailored to the specific needs of the procurement, this specification can be tailored out, and specific DTDs included in the solicitation. This can be an interim measure until actions are taken to develop DTDs for other types of Army publications. MIL-HDBK-CALS contains recommendations for procurement verbiage and guidance on how to tailor the standards and specifications contained in MIL-STD-1840A. Therefore, this guidance will not duplicate that effort.

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